CHARQUI MEATS ARE FERMENTED MEAT PRODUCTS

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BACKGROUND

Charqui and "Jerked beef" meats are members of a traditional Brazilian salted meat products family because both are derived from similar technological processes thus they will collectively be known as charqui meats. Differences between them are the introduction of sodium nitrite at the initial phase and vacuum packaging at the end of processing exclusively for Jerked beef. The technological methodologies follow yet the traditional salting and drying techniques based on the hurdle technology food processing (1) as discussed elsewhere (2). Recently, much have been discovered about these products. Biochemical and qualities parameters were discussed by us in which we reported the occurrence of lipid oxidation (3); and also we firstly described charqui meats as intermediate moisture meat products (4). The ultrastructural observation on charquis was also evaluated where changes at the myofibrillar and connective tissue proteins level were noticed in relation to fresh meat which affect their texture profile (2, 5). Microbiological contamination of these products at the retail conditions was also investigated and presence of *Staphylococcus* was firstly revealed (6). This fact called out our interest to study the possibility of charquis being fermented meat products as observed in salami or cured hams. In this work, we are reporting further evidence of the occurrence of fermentation on charqui meats and also the addition of commercial *Staphylococcus* strains at the initial stage of processing to acting as starter culture and the consequence on the products quality characteristics.

OBJECTIVES

To determine the charqui meats fermentation nature during processing

METHODS

Starter cultures

Staphylococcus carnosus - Floracarn S strain and *Staphylococcus xylosus* Floracarn strain both kindly donated by Há-La from Brazil-Chr. Hansen , Valinhos, SP, Brazil.

Sample preparation: Charqui as Jerked beef was processed as described in (2). However, some modifications were introduced in order to avoid microbiological contamination. Basically consists on selection of *Supraspinatus m.* which was dipped into 70% ethanol for 2 min and then flamed with a Bunsen burner. Using a sterile knife, about 1.25cm of the sample's exterior was aseptically trimmed away (7) Three sterile saline solutions were injected in three different samples of *Supraspinatus m.*: one containing *S. carnosus*, the other containing *S xylosus* about 108 viable cells/ml for both bacteria and finally, the third only brine was injected as control sample.

Proteolytic activity measurement: This technique was based on (8) in which 10g of sample were extracted with KCl 0.6M. In the resultant KCl extract, TCA 10% was added when protein and high molecular weight peptide fragments precipitated.

Sensorial evaluation : Samples were firstly desalted and cooked and submitted to Paired Preferential Test Analysis by trained test panel according to (9).

Statistical Analysis: Data was analyzed statistically under unidimensional descriptive analysis and classical regression analysis (10; 11).

RESULTS AND DISCUSSION

Microbial counts: Table 1 shows the microbial counts and identified microorganisms present throughout JB processing, raw material, brine and JB samples. Although the microorganism counts do not change substantially a relevant modification on the patterns of microorganism species has been noticed. Fresh meat contains basically *Staphylococcus sp.* (47.2%), *Micrococcus sp* (17.6%), *Lactobacillus sp* (17.6%) and *Coryneformes* (17.6%). Saline solution contains *Staphylococcus sp* (63.0%), *Micrococcus sp* (14.8%), *Bacillus sp* (7.4%) and *Coryneformes* (14.8%). The presence of *Staphylococcus sp* (84.2%) and *Micrococcus sp* (15.8%) was detected in every JB samples. Conversely, it has not been observed the presence of *Staphylococcus* coagulase positive. This microbial composition found in JB is somewhat similar to most European fermented meat products such as Basturma, typical of Mediterranean east countries (13) and cured hams (8). The importance of microorganisms to produce and to enhance typical sensorial characteristics is well established (14) thus it is a common practice to process these products adding starters culture (15).

Fate of proteins fractions as consequence of starters culture addition: Table 2 shows the solubilization of sarcoplasmic and myofibrillar proteins during incubations of *S. carnosus* and *S xylosus.* The half volume of total solubilized protein fraction in 0.6M KCl was treated with TCA (10%) which precipitated intacted proteins hence peptides and free amino acids present in the supernate would indicate the actual proteolysis during charqui fermentation. The % of this fraction in relation to the total solubilized protein could be used as an index of proteolytic action of starter culture. Thus both microorganisms present higher values being *S. xylosus* more intense.

Sensorial test for preference: As shown in Table 3, the test panel prefers samples with added starters culture. The preferred sample is the one which was treated with *S. xylosus* which also shows to have more intense proteolytic activities. These results are in accordance with the fact of Staphylococcus to produce active proteolytic enzymes therefore to be responsible of relative increase of flavor concentration as consequence of further peptides and free aminoacids production during meat fermentation (12).

In our work, we managed to isolate both Staphylococci spp. (coagulase negative) and Micrococci spp. strains from charqui meats with good proteolytic activity enzymes. They can potentially be employ as starter culture and this possibility is currently under investigation.

CONCLUSIONS

Charqui meats are fermented meat products and isolated microorganisms profile is similar to European dry fermented sausages.

TABLE 1. Microbial counts expressed as log of colony forming units (CFU/g) and quantity of identified micro-organisms during processing of charqui as jerked beef

Sample	Culture Media				Micro-organisms	%
	AST	CHAPMAN	AST+15% NaCl	ABD		
Raw meat	$8.5x10^4$	$1.7x10^4$	$8.2x10^3$	$6.0x10^3$	Staphylococcus sp	47.2
					Micrococcus sp	17.6
					Lactobacillus sp	17.6
					Coryneformes	17.6
Brine	$1.2x10^6$	$1.0x10^6$	$3.6x10^4$	$7.1x10^3$	Staphylococcus sp	63.0
					Micrococcus sp	14.8
					Bacillus sp	7.4
					Coryneformes	14.8
JB	$6.8x10^4$	$4.7x10^4$	$2.6x10^4$	$1.0x10^3$	Staphylococcus sp	84.2
					Micrococcus sp	15.8

TABLE 2. Charqui protein fraction solubilization after addition of starters culture

Sample	Soluble protein fraction in 0.6M KCl (A)	Soluble protein fraction after precipitation in TCA 10% (B)	% of (B) in (A)
Control	3.700 mg/ml	0.103 mg/ml	2.78
S, carnosus	1.370 mg/ml	0.083 mg/ml	6.03
S. xylosus	1.710 mg/ml	0.112 mg/ml	6.55

TABLE 3. Paired preference test between charqui processed with starters culture

Sample	Sample preference number	Significance level
S. xylosus vs.	19	0.02
Control	6	
S. carnosus vs.	18	0.05
Control	7	
S. xylosus vs.	18	0.05
S. carnosus	7	

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